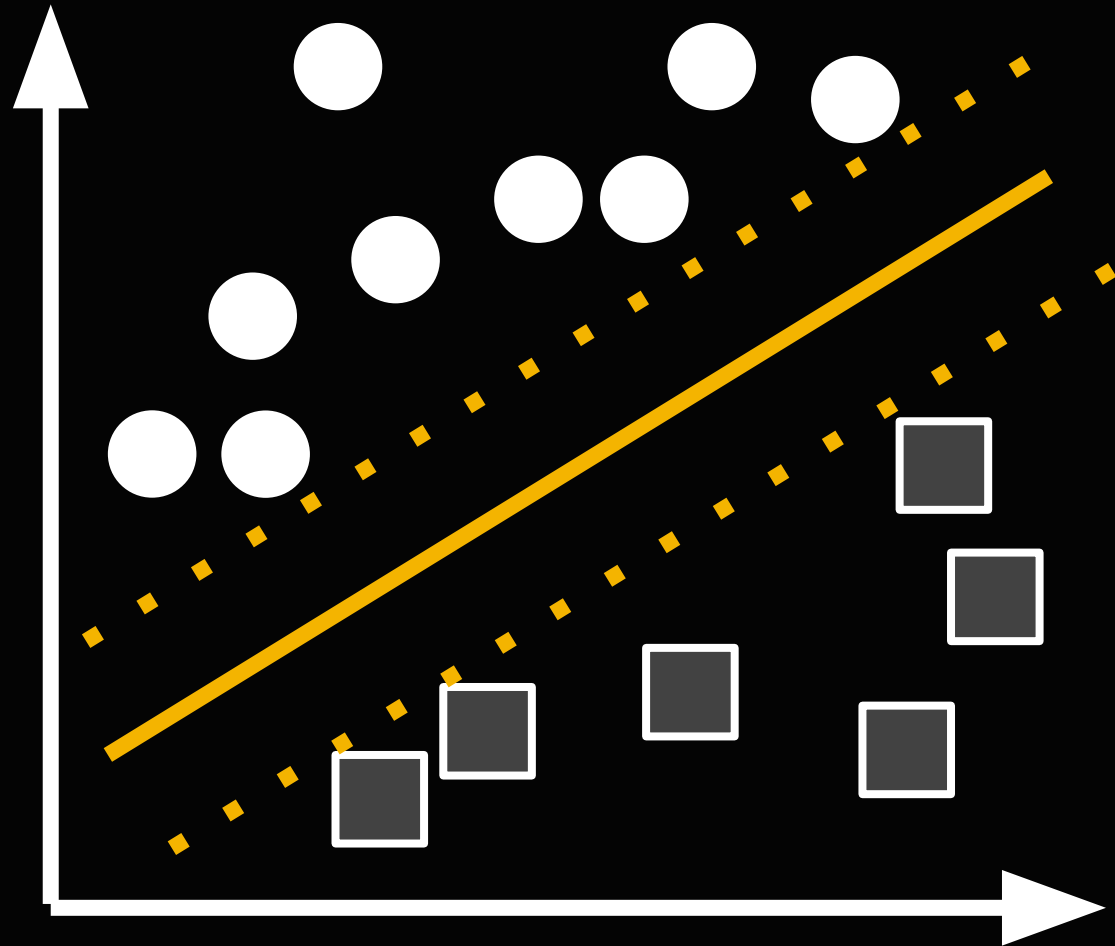
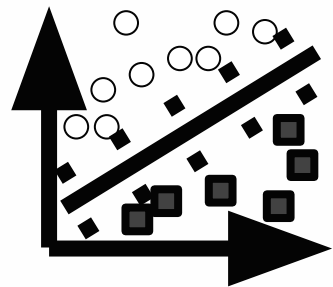


Why we
need SVM



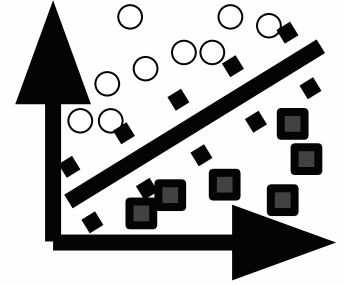
Support Vector Machine

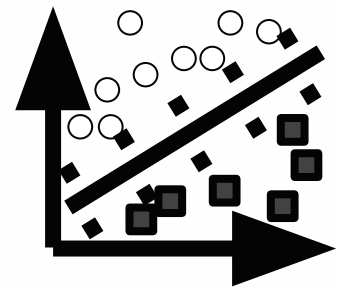


- Famous supervised machine learning algorithm
- Powerful and flexible

Applications

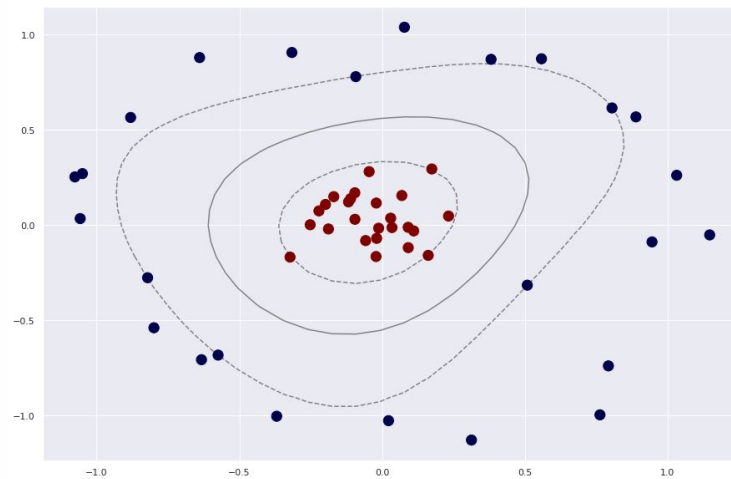
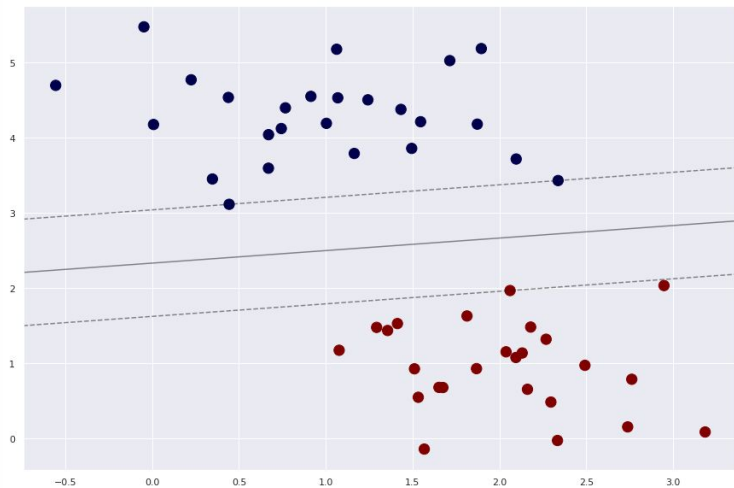
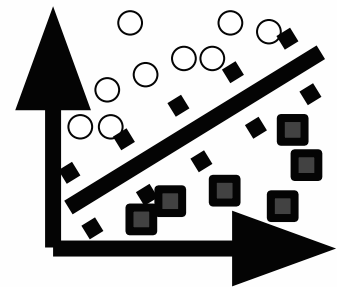
- Recognize handwritten words
- Detect intrusion with motion detection
- Detect faces in images
- Classify spam vs non-spam emails
- Classify malignant vs benign masses

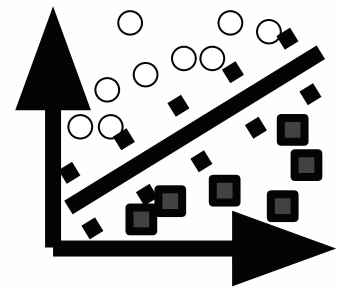




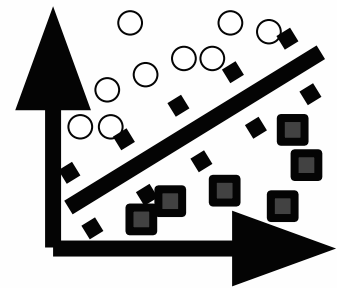
- Used for **classification, regression, outlier detection, clustering**
 - Mostly classification

Works on linear and non-linear data!



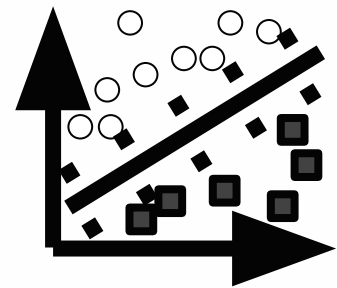


Generative vs Discriminative Models



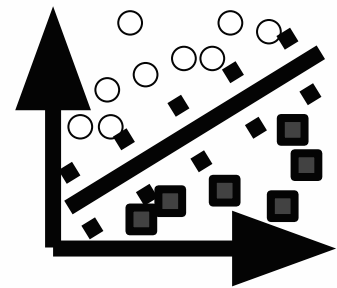
Generative Model

- Describes the **distribution** of each underlying class
- Used to **probabilistically determine labels** for new points.

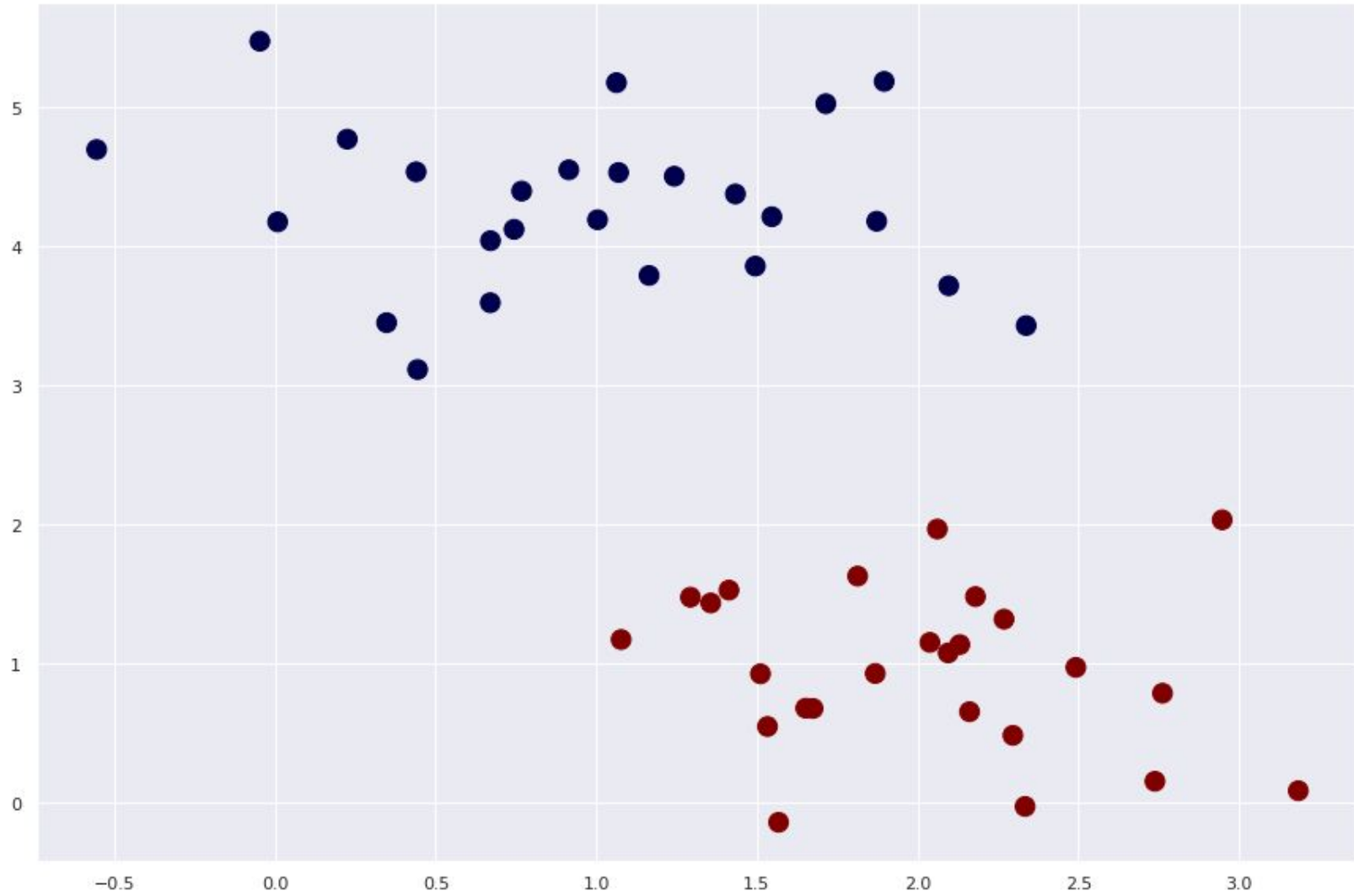


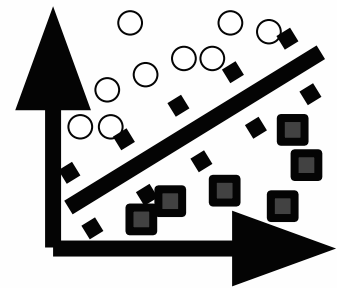
Discriminative Model

- Rather than modeling each class, **find a line or curve**
(in two dimensions) or manifold (in multiple
dimensions) that **divides the classes**

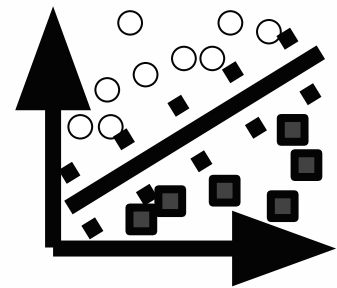


Example



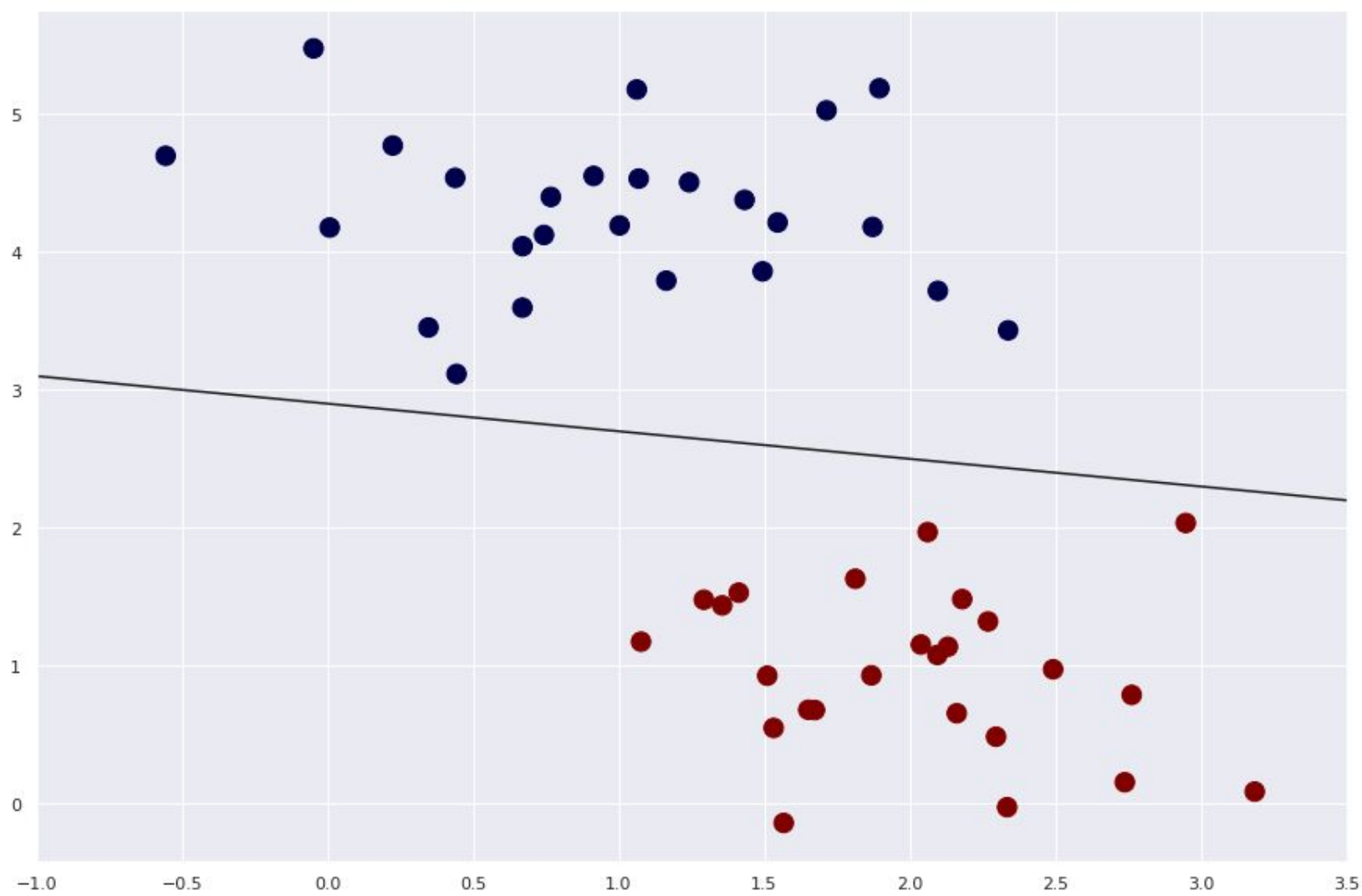


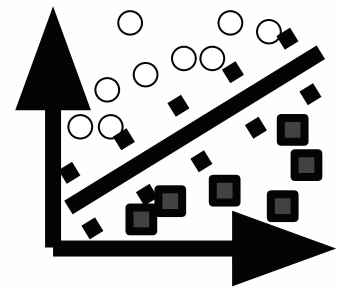
How do we classify a new data point on the graph into the blue class or the red class?



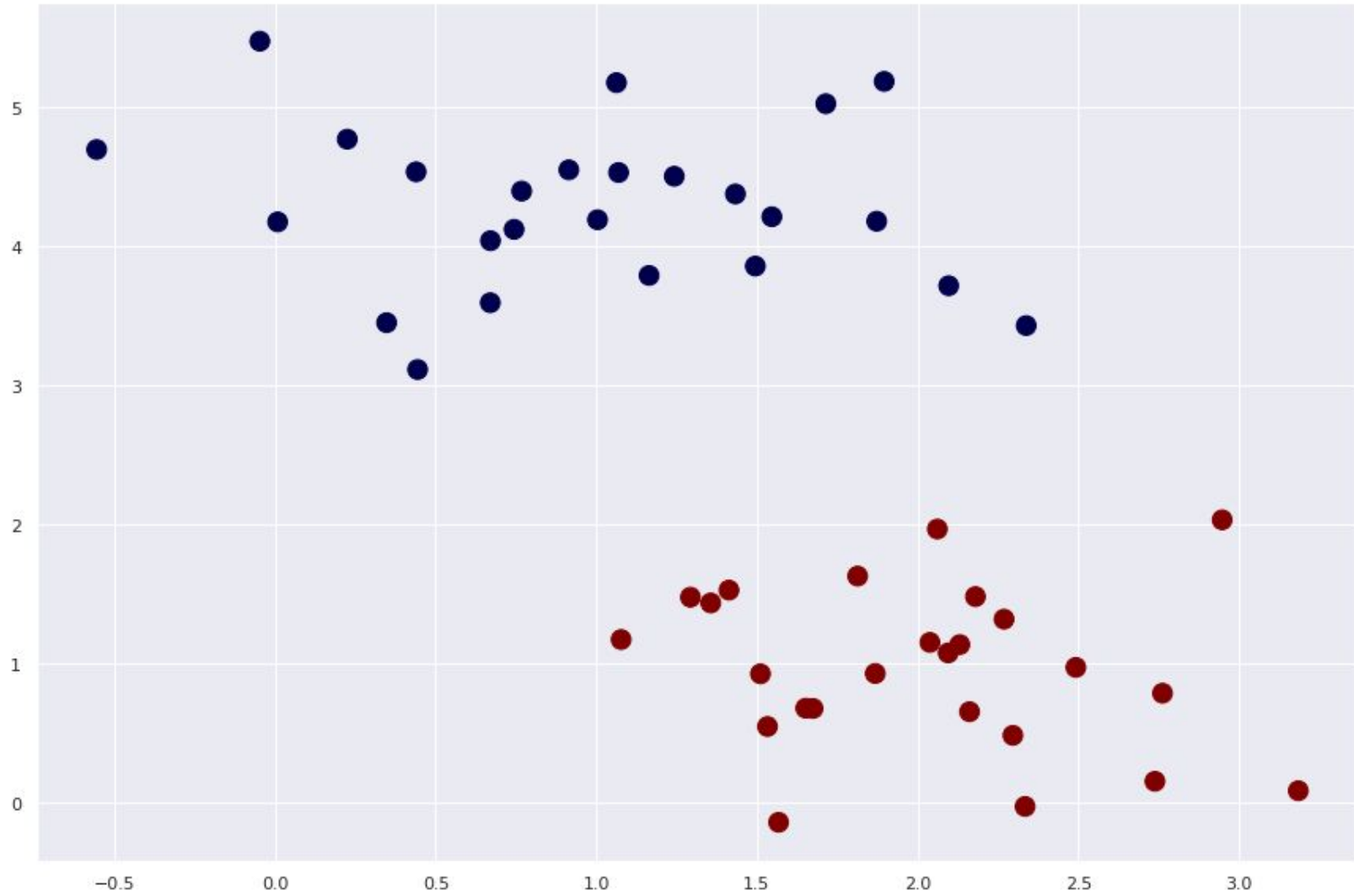
Linear discriminative classifier

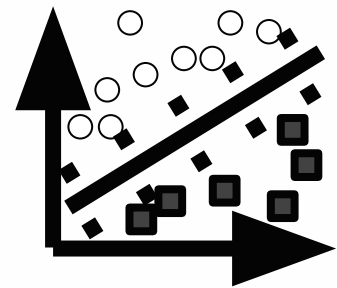
- Draw a straight line separating the two sets of data
 - Creates a model for classification



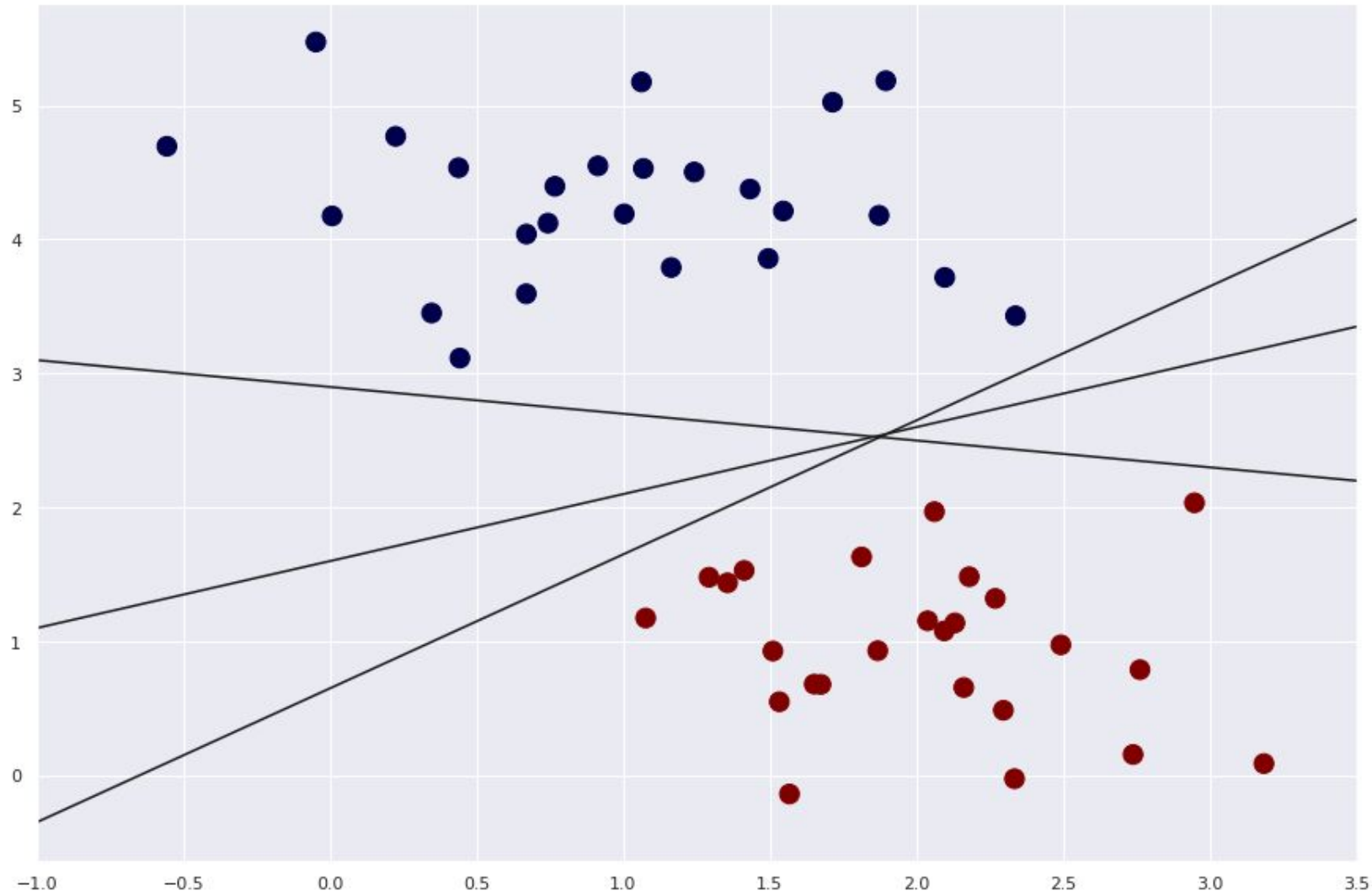


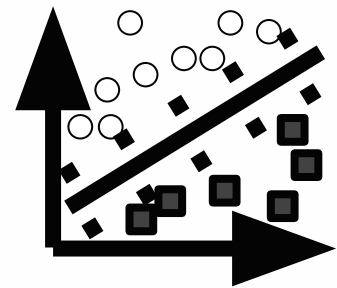
But do you see a **problem**?





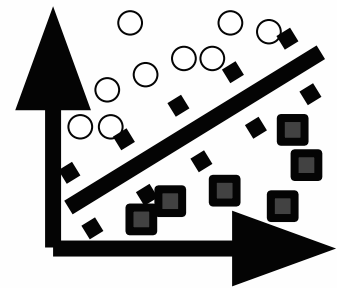
There's **more than 1** possible perfect
dividing line!





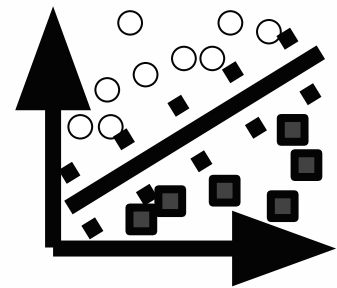
Why is that a problem?

- **3 VERY different separators** perfectly divide the samples
- Depending on which line you draw, a new data point could get a **different class each time!**



What's next

- We need a solution.
- How do we pick a line?



SVM to the rescue.

Why we
need SVM

